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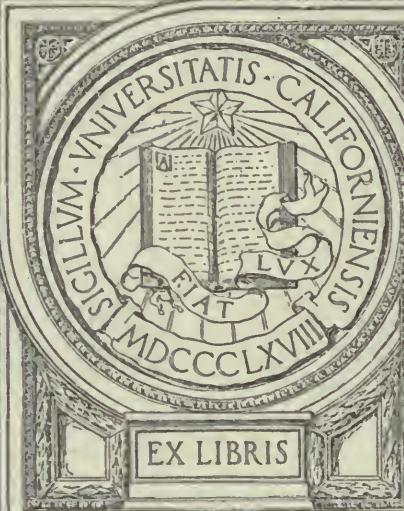
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Functional and Unit Cost Accounting for Municipalities and Its Application by the City of New York

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FUNCTIONAL AND UNIT COST ACCOUNTING FOR MUNICIPALITIES AND ITS APPLICATION BY THE CITY OF NEW YORK.

Paper read at the Eleventh Annual Convention of the National Association of Comptrollers and Accounting Officers, held at Syracuse, N. Y., June 1, 1916.

By FRANKLIN M. HARND,

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Most men think of cost accounting as something of a very complicated nature, quite unintelligible to the average citizen. It will help me in what I am about to say if you will consider municipal cost accounting as merely the following of the assets of a city until they are finally disposed of. Some will go into roads, some into buildings and into other works of a permanent nature. Other assets will be expended for public service, such as protection to life and property, for education, for the care of the poor, etc. It is comparatively easy to check the cost of most construction work. Given the kind of building and its cubical contents or the class of road and the number of miles, data can be had to give a fair estimate of its cost.

As a rule, however, the greater part of municipal expenditure is for personal service and for supplies and materials for which we have at the end of the year no tangible assets—nothing upon which we can lay our hands. How to measure such expenditures, how to make them produce the largest benefit per dollar spent is our problem, for in practically all of our larger American cities the tax-budget appropriations are increasing far more rapidly than is the population or the property values.

Few of our cities are able to show more than the fact that in a certain year they have raised so much money and spent so much money and have so much left. The budgets of most of them are based upon the expenditures of the preceding year, these amounts being increased in many instances by a more or less generous percentage to provide for estimated additional requirements.

The defect here is the assumption that all the expenditures of the preceding year were actually necessary and there is the further fault that the expenditures for stores often vary widely from the amount actually consumed or made of actual service. New York has been through this experience and, believe me, it has been a costly one. How then shall we get away from it? Obviously, the mere conviction that something is wrong, that the expenses of government are too high, does not help much. Just as obviously, before remedies can be intelligently applied to excessive expenditures, some agency must point out the specific

expenditures at fault. This agency, some of us feel certain, is proper cost accounting. It has been of great value to many industrial enterprises. Largely because of their rapid growth and great size it is impossible for any one man, without proper records and reports, intelligently to follow the activities of such enterprises and to grasp readily defects in policy or in administration. Industrial concerns by reason of competition and to maintain necessary credit or borrowing power have been compelled to install cost accounts. Municipalities, largely because they have practically a perpetual income in the way of taxes, have been slower to adopt such methods.

From the municipal standpoint, the main purposes of cost accounting are:

1. To point out inefficient service and management and wastes in materials and supplies.
2. To provide a standard cost of service and thus provide a check on future costs.
3. To show whether it is costing more to manufacture an article or to perform a service than it would cost to buy it.

The title of this paper speaks of functional and unit costs. We might treat the maintenance of an entire city as a function of government, and we might treat the maintenance of the departments of health and of street cleaning as sub-functions of this main function. So, too, we might divide the activities of each of these departments into various functions. These functions in the department of street cleaning we might classify as the care and maintenance of stables, the feeding of the horses, the sweeping of the streets, the collection of ashes and rubbish and garbage, and the final disposition of them. If we divide the costs of each of these functions by the number of work units performed, we arrive at unit costs; for example, the total cost of collecting ashes divided by the number of cubic yards collected would give us the cost per cubic yard.

As to the use and value of unit costs, let us consider the maintenance and care of stables. We might compare the unit costs of stable "A" in 1915 with the unit costs of the same stable in 1914, or we might compare the unit costs of stable "A" in 1915 with the costs of stable "B" in the same year. We will assume that the respective costs of stable "A" and stable "B" differ widely in 1915. We seek the reasons for these variations. One reason might be the use of stable "A" to its full capacity; of stable "B" to only part of its capacity. Other reasons might be a difference in the cost of repairs, due perhaps to a difference in the ages of the stables, or owing possibly to careless management, or there might be too many mechanics to find work for; there might be more hostlers or stablemen in one stable in proportion to the number of horses than in the other stable; the number of foremen might also be disproportionate; the cost of stable supplies might, too, differ very widely.

First we must satisfy ourselves as to what is a fair cost for each variety of service, and then try to decrease it, or at least prevent it from increasing.

Another method of comparison is the matching up of the cost of the service with the value of the articles to be conserved. The cost of the receipt and storage and distribution of stores is oftentimes too great a percentage of the

value of the stores. This may mean too many employees, too frequent deliveries, too many storage points, or too small a quantity of stores at a certain point to warrant the overhead expense in connection with them. The cost of repairs to the value of the equipment repaired may also be so great a percentage as to indicate that the equipment should have been replaced with new equipment.

The percentage of the cost of administration and supervision may also be very excessive as compared with the cost of wages and materials entering directly into the cost of service performed. Expenses other than direct expenses are very apt to be overlooked when the cost of governmental and municipal work is compared with the cost of that done by private concerns. I might mention two recent instances of this kind. The Federal government proposed to build its own armor plant, basing its action partly upon the assertion that whereas the Bethlehem Steel Company charges \$395 a ton for armor plate, the government can manufacture it for \$263, a saving of \$132 a ton. The Bethlehem Steel Company says, however, that the figure estimated by the government makes no allowance for administration and general expense, for insurance, taxes and depreciation of plant, or for interest on investment and working capital—that the government's figure represents merely shop cost. It is also assumed that the government plant will be run at full capacity, which is not usually the case with a private plant of this nature.

The other instance I have in mind is the Cleveland, Ohio, municipal lighting plant. The National Municipal Review states, April, 1916, that it is claimed for this plant that for the first seven months of 1915 it showed a profit of \$33,000. The private company operating there contends, however, that in the municipal accounts too little reserve has been set aside for depreciation, that not enough has been charged for interest on investment, and that a sinking fund reserve has been neglected. It asserts that if these expenses had been provided for the result would have been not a profit of \$33,000, but a loss of \$81,000 in the period mentioned. Assuming these figures are true, such a policy of governmental and municipal service would be disastrous both to the private concerns affected and to the taxpayers; for it would tend to depreciate the value of the property of the former and to create a continuous deficit to be met by the latter. Apply the same overhead conditions to municipal repair shops, asphalt plants, etc., and I am inclined to think that they, too, would in many cases be found anything but profitable enterprises.

Now as to the requirements of a cost accounting system these things are necessary:

1. A classification of the functions, the costs of which are to be ascertained.
2. Time records which will show the specific service rendered and the time actually spent upon it.
3. Stores records which will show the quantity and value of stores disbursed for each function.
4. Records showing charges which are for neither personal service nor stores, such as work done by contract, rent, light, heat and power. If we are to compare municipal costs with private costs, it is vital that we

also consider interest on the city's investment, the loss of taxes, depreciation, etc.

5. Adequate statistics to arrive at unit costs—so many people fed, so much surface of street cleaned or repaired, so many cubic yards of ashes removed, the value of the stores cared for or disbursed, the direct cost of work performed, as a basis for reckoning the percentage of the cost of supervision, etc.

Records of this sort have been set up in practically all of the larger departments of The City of New York and in many of the smaller ones and the extension of the work is still in progress.

An idea of the functional classification may be had from those applied to the four hospitals of The City of New York included in the department known as Bellevue and Allied Hospitals.

The function General Administration for all hospitals is divided into the sub-functions—Executive, Audit and Accounts, Purchase of Supplies, and Engineering Supervision.

The main classifications of the individual hospitals are: Administration, Professional Care of Patients, Kitchens, Dining Rooms and Pantries, House-keeping, Plant Service, Ambulance Service and Dispensary.

These classifications are further subdivided. I will give but one example, Professional Care of Patients, the sub-classifications of which are: Admitting, Wards and Operating, Convalescent Relief, Pharmacy, X-Ray Laboratory, Training School, Women Nurses; Training School, Men Attendants; Training School, Midwives. And for each of these items is shown the cost of the personal service, supplies, etc., applied to it.

The total cost of hospital service is divided by the total days' treatment to secure the cost per patient per diem. The dispensary cost is reduced to a cost per treatment.

Work of this nature is apt to meet with opposition in proportion to the need of it. It is reported to have been said in one of the county offices that no such accounting system was wanted there; the office would lose half its force. Others think that to explain on a time record just what they did and how long it took them to do it is beneath their dignity. Still others think they can get the same results as can be had from the time records by arbitrarily assigning the time of numerous employees to the various functions performed. Needless to say, their records do not bear out their optimistic views. Some object, too, to the additional office work the collecting of the costs and the necessary statistics will entail, although this in no case should be great, and can, for the most part, be done by mere clerks.

Some of the matters brought to our attention directly or indirectly by this cost accounting are:

1. The need from the standpoint of economy of centralizing many of our offices. We have for instance within our municipal borders five complete county organizations, five highway bureaus, five sewer bureaus, four park departments, three street cleaning organizations, and so on.

Instead of having a central purchase bureau, practically every department does its own buying. Many of the departments with considerable repairs to make have one or more repair shops. Much of our accounting, too, I regret to say, is duplicated. Just how much could be saved by consolidating these activities I cannot say. It would appear to be a great sum.

2. The revenues from two of our productive activities are barely enough to carry them. In the Dock Department some of the docks were leased too cheaply and there were unnecessary charges for maintenance and operation. In connection with the water supply plant it was developed that 50 per cent. of the gross revenues was derived from 26 per cent. of the total water supply. This would indicate the advisability of extending the metering of water, now substantially confined to business houses, to apartment houses and private residences. The better we can conserve the water supply the longer can we defer seeking an ever-increasingly expensive additional supply. As conditions are now, all the water wasted in apartments and private houses by defective plumbing, by leaking faucets, by the unnecessary flow to secure coolness in summer and to prevent the freezing of pipes in winter, falls upon the city. Were each water user compelled to bear the cost of his own carelessness or improvidence, the result to the city would, I feel sure, be very pleasing.

3. The excessive overhead costs for supervision, engineering, accounting, etc., have led to heavy reductions in force in several departments. Especially has this been the case where heavy reductions in construction work were not followed by corresponding reductions in the construction forces.

4. The excessive cost of repairs has led to the reduction of repair shop forces. In one instance the cost of repairs to one piece of equipment which cost originally \$800 amounted in one year to over \$1,300. The mechanics simply had nothing else to do.

5. The cost of receiving, storing and disbursing stores was in many instances too great. Some of these excessive costs have been reduced; others will be.

6. The unit costs of doing various work have been reduced because comparison with other unit costs of similar nature showed them to be too high.

7. Some of the work formerly done by city employees it is now proposed to do by contract.

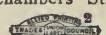
In conclusion I would say that in my opinion most municipalities would be benefited by work of this nature, if it is undertaken at first in a simple and inexpensive way. A simple system can be extended later, if desirable, but one unduly complicated should be avoided at the start. Let the results shown by the simple system justify the amplification of it.

We have made a beginning only. Doubtless we shall remodel our classifications from time to time, and doubtless the analysis of new data put before us from time to time will give us new viewpoints and lead us to further savings. It should be borne in mind, however, that cost accounting can do no more than

point out the weak spots. So far as the reports are delayed, so far as the defects disclosed are uncorrected, so far will the monies expended on cost accounting be wasted.

If, however, you are really bent on economy, it will pay you to give this subject earnest consideration. Unfortunately, if you really need a cost accounting system you pay for it whether you install it or not.

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